WATERBORNE TRANSIT

INTRODUCTION TO WATERBORNE TRANSIT

Waterborne transit technologies have been devised for one of several areas with special needs or constraints that are not well served by traditional bus or rail systems. Although long and even floating bridges have been built for bus and rail technologies to cross water bodies, the demand levels are often too low or the distances across the water too great to justify such investment. It is in these circumstances that waterborne transit is most applicable. This technology category includes pontoons and skiffs, mono-hull vessels, catamarans, and hydrofoils.

Waterborne transportation systems can provide economical, fast and pleasant travel across bodies of water. A variety of marine vessel technologies currently operate worldwide. The type of vessel used depends on the type of water body, passenger capacity requirements, length of trip, depth and width of waterway, and docking requirements or accommodations. Waterborne transportation systems are generally accessible by people with disabilities via ramping (gangplanks) between the dock and the vessel. The U.S. Coast Guard establishes and enforces safety regulations for marine vessels in public service.

Technologies applicable to the National Park Service for serving passenger travel on open and protected waters include four main categories of boats. For very small numbers of passengers, pontoons and skiffs may be used. For larger volumes of passengers, mono-hull ferries, catamaran ferries, and hydrofoils are employed. Smaller versions of mono-hull ferries, catamaran ferries, and hydrofoils may also serve moderate-sized groups of passengers.

Boats are currently used in fifteen of the National Parks; examples include the Everglades in Florida, Isle Royale on Lake Superior, Glen Canyon / Lake Powell in Utah, and the Channel Islands in California. Many of these parks include coastline property and islands, while others include service to land-locked lakes. For a number of parks, boats provide the primary means of access and transportation for the visitors.

Specific advantages and disadvantages of using water transport systems in federally-managed public lands depend on the-specific conditions and the type of marine vessel used. Site considerations may include land availability, automobile access, depth and width of waterway, and cost efficiencies compared to other transportation and infrastructure systems. Marine vessels are most appropriate when a water route is more direct or more cost-effective than a land route or necessary where the primary site is not accessible by land. The level of passenger interaction and assistance on the part of the operator depends on the specific water transport system in place. Water transport systems do not typically allow the operator a high level of passenger assistance.

Data related to the physical and operating characteristics of the four types of commonly used boats are provided below. The duration of the useful life of the vessels is assumed to be relatively similar among all four categories. All categories are generally powered by on-board, internal combustion engines, although the pontoons and skiffs may be also powered by oars. The data provided below is not meant to be exhaustive but rather an overview to compare categories.

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Pontoons and Skiffs

PONTOONS AND SKIFFS

Other Names: None

Description
Pontoons and skiffs are small boats that generally carry fewer than forty passengers. Pontoons are small square-shaped boats that float on tubes. The water does not contact the hull directly in this case. The tubes may be of various compositions including air, foam, and other materials. Skiffs are flat-bottomed, open boats with shallow drafts. Unlike pontoons, skiffs are characterized by their pointed bow, square sterns. Pontoons and skiffs may be propelled by oars, sails or motors.

Characteristic	Advantages	Disadvantages
Maneuverability	- Highly maneuverable.	- Slow to very slow operating speeds.
Durability	- No significant advantages.	- Low to moderate life span.
Operator Availability	- Ready supply of operators. - No special operating requirements for crew.	- No significant disadvantages.
Noise	- If propelled by oars, sails, or trolling motors, they can be very quiet.	- Motors, particularly of the outboard type may create objectionable sound levels.
Fuels	- Diesel, gas, or gas/oil mix.	- Little to no availability of other fuel types.
Cost	- Low initial/capital cost relative to other vessel types. - Does not require high investment for terminal facilities.	- High operating cost relative to the number of passengers that can be served.
Vehicle, Parts, Service Availability	- Ready supply of manufacturers and mechanics. - Ready supply of lease/rent/charter opportunities.	- No significant disadvantages.
Compatibility with Federally-Managed Sites	- Provides good accessibility to remote locations.	- Not effective for serving point-to-point travel.
Vehicle Features	- Good for shallow and no-wake waters. - Low deck height or seating near level with water provide good viewing opportunities. - Open air versions are common and increase the viewing opportunities.	- Low sea-going stability. - Little or no passenger protection from the elements.
Other	- No significant advantages.	- No significant disadvantages.

Physical Data

Length:	20 to 40 feet
Beam:	10 to 15 feet
Draft:	1 to 2 feet
Power Source:	Gasoline

Operating Data

Maximum Operating Speed:	10 to 20 knots
Maximum Grade:	Not applicable.
Passengers	
Seated:	5 to 30
Standees:	10 to 20
Total:	10 to 50

Economic Data

Vehicle Cost:	$20,000 to $60,000
Vehicle Life:	10 to 15 years

Notes
None.

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Mono Hull Vessels

MONO HULL VESSELS

Other Names: None

Description
Mono-hull or conventional displacement vessels are the most common vessels used in boat transportation. A wide variety of sizes are available and in use in tour and shuttle-oriented applications worldwide. These vessels are constructed of steel or aluminum. Mono-hull vessels are somewhat slow and cumbersome compared to other marine vessels.

Characteristic	Advantages	Disadvantages
Maneuverability	- No significant advantages.	- Low operating speeds relative to other vessels. - Deep draft may require dredging.
Durability	- Long life span of 20 years.	- No significant disadvantages.
Operator Availability	- Ready supply of operators. - No special operating requirements for crew.	- No significant disadvantages.
Noise	- No significant advantages.	- No significant disadvantages.
Fuels	- Diesel.	- No other fuel types at this time.
Cost	- Low initial/capital cost, relative to other large vessels. - Operating cost low relative to the number of passengers that can be served.	- High cost for terminal facilities.
Vehicle, Parts, Service Availability	- Ready supply of manufacturers. - Ready supply of lease/rent/charter opportunities.	- No significant disadvantages.
Compatibility with Federally-Managed Sites	- No significant advantages.	- No significant disadvantages.
Vehicle Features	- Variety of sizes available. - Very reliable operation. - Multi-deck vessels offer good viewing opportunities. - Enclosed decks protect passengers from the elements.	- Large size creates crowding of docks.
Other	- No significant advantages.	- No significant disadvantages.

Physical Data

Length:	75 to 175 feet
Beam:	14 to 34 feet
Draft:	4 to 8 feet
Power Source:	Diesel
Right of Way:	

Operating Data

Maximum Operating Speed:	20 to 30 knots
Maximum Grade:	Not applicable.
Passengers:	50 to 2000
Autos:	0 to 400
Fuel Consumption:	35 gallons/hour
Range:	65 to 69 hours

Economic Data

Vehicle Cost :	$1.0 to $15.0 Million (passengers only) $5.0 to $100.0 Million (passengers and autos)
Vehicle Life:	20 years

Notes
None.

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Catamarans

CATAMARANS

Other Names: Dual Hull Vessels

Description
Catamarans are dual hull vessels with a deck between the hulls. These vessels are typically built of aluminum to reduce weight and increase speed. Catamarans are stable in rough water and offer excellent passenger service.

Characteristic	Advantages	Disadvantages
Maneuverability	- High operating speed. - Shallow draft does not require dredging.	- Width may require widening of channels.
Durability	- Long life span of 20 years.	- No significant disadvantages.
Operator Availability	- Ready supply of operators.	- No significant disadvantages.
Noise	- No significant advantages.	- No significant disadvantages.
Fuels	- Diesel.	- Little to no availability of other fuel types.
Cost	- Operating cost low to moderate, relative to the number of passengers that can be served.	- High initial/capital cost. - High cost for terminal facilities.
Vehicle, Parts, Service Availability	- No significant advantages.	- Limited number of suppliers.
Compatibility with Federally-Managed Sites	- No significant advantages.	- No significant disadvantages.
Vehicle Features	- Large deck surface. - Good sea-going stability. - Offer good viewing opportunities. - Enclosed decks protect passengers from the elements.	- Large size creates crowding of decks.
Other	- No significant advantages.	- No significant disadvantages.

Physical Data	
Length:	60 to 250 feet
Beam:	18 to 40 feet
Draft:	2 to 6 feet
Power Source:	Diesel

Operating Data	
Maximum Operating Speed:	25 to 35 knots
Passengers:	40 to 400
Fuel Consumption:	35 to 45 gal/hour
Range:	20 to 22 hours (300 miles)

Economic Data	
Vehicle Cost:	$1.0 to $3.0 Million
Vehicle Life:	20 years

Notes
None.

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Hydrofoils

HYDROFOILS

Other Names:

Description
Hydrofoils travel above the water surface on metal struts called foils. The underwater foils are operated hydraulically to lift the hull out of the water at high speed. These vessels are expensive and require deep channels. They are most useful for point-to-point, long-distance travel, where the hydrofoil's high speed can be used to its best advantage. Hydrofoils are susceptible to damage from floating debris.

Characteristic	Advantages	Disadvantages
Maneuverability	- High operating speed.	- Deep draft may require dredging. - Not operable in rough waters.
Durability	- Moderate to long life span of 10 to 15 years.	- No significant disadvantages.
Operator Availability	- No significant advantages.	- Requires specialized crew.
Noise	- No significant advantages.	- High noise levels.
Fuels	- Diesel or gasoline.	- Little to no availability of other fuel types.
Cost	- No significant advantages.	- High cost for terminal facilities.
Vehicle, Parts, Service Availability	- No significant advantages.	- Limited number of suppliers.
Compatibility with Federally-Managed Sites	- No significant advantages.	- No significant disadvantages.
Vehicle Features	- Good sea-going stability. - Enclosed cabin protects passengers from the elements.	- Poor visibility from interior due to hull spray and incline. - Submerged foils prone to damage.
Other	- No significant advantages.	- No significant disadvantages.

Physical Data	
Length:	40 to 120 feet
Beam:	15 to 50 feet
Draft:	
Foil-borne	4 to 8 feet
Foils Submerged	6.5 to 12 feet
Power Source:	Diesel or gasoline

Operating Data	
Maximum Operating Speed:	30 to 50 knots
Passengers	50 to 200
Fuel Consumption:	50 to 500 gallons/hour
Range:	2 to 5 hours

Economic Data	
Vehicle Cost:	$5 to $15 Million
Vehicle Life:	10 to 15 years

Notes
None.